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REVIEW OF I. L. KAGANOV'S WORK  
"ELECTRONIC AND IONIC CONVERTERS"  
PART I: ELECTRONIC ENGINEERING"

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Electronic and Ionic Converters has been approved by the Ministry of Higher Education as a textbook for electrical and power engineering schools and faculties. Although the book has been published previously (second edition, 1940), Part I, consisting of eight chapters, is practically a new book.

Chapter 1, "The General Theory of Rectification," contains an account of the basic theory of single-phase, two-phase, and three-phase rectifier circuits for various types of load and basic information on the operation of filters.

Chapter 2, "Semiconducting Rectifiers and Their Application," gives the physical theory of these rectifiers. Design methods are given, illustrated by typical examples.

Chapter 3, "Electronic Rectifiers," describes the construction and operating principle of diodes. Pertinent information from molecular physics and high-vacuum practice is included.

Chapter 4, "Electronic Rectifiers With Grid Control," clarifies the role of grids in electronic rectifiers and gives the more important characteristics of multigrad tubes, with examples of their application.

Chapter 5, "Electronic Amplifiers," is a step-by-step account of the design of the amplifier circuits most often used in industrial electronics.

Chapter 6, "Electronic Oscillators," includes a description of the oscillator circuits of major industrial importance. Oscillators producing pulses of special form are also described.

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Chapter 7, "Photoelectric Devices and Their Applications," contains the fundamental theory of the photoelectric effect. Various types of photocells and photoelectric devices are described.

Chapter 8, "Cathode-Ray Devices and Their Application," gives an account of the principles of electron optics. Various types of cathode-ray tubes and some characteristic applications of the cathode-ray oscilloscope are described.

Even this brief review of the contents shows that much more attention has been given to electronic amplifiers than in previous editions. The section dealing with electronic oscillators has been developed into a separate chapter in deference to the ever-increasing use of high frequency in industrial installations. The chapter on semiconducting rectifiers has been revised and enlarged to include the latest studies in this field and the increased application of photocells in industry has caused considerable revision of the chapter treating this subject.

In every chapter, the author explains the physical principles underlying the operation of the instruments, analyzes their operating properties, describes the construction, furnishes technical characteristics and parameters, and gives typical circuits for the use of the instruments. Calculations in specific cases are illustrated by practical examples.

The great merit of the book is that it covers the development of electronics during recent years. In addition, the achievements of Soviet engineering and the leading role played by Soviet science are emphasized.

This textbook was designed to follow the study schedule in the "Industrial Electronics" course for various departments of the Moscow Power Engineering Institute. The material is arranged in such a way that the first paragraphs of the proper chapters may be studied separately if the time available to a certain department does not permit coverage of the course.

The author has put great stress on using the correct terminology. Only individual cases like the phrase "bridge circuit" are not used in the generally accepted sense and could be improved.

Another problem was that a step-by-step proof of all formulas is impossible in a book of this type. Therefore, all formulas used had to include references to the appropriate literature. This was done quite carefully throughout the book, there being only two or three cases in which the sources are not clearly identified.

The alphabetical index at the end of the book should be supplemented by the inclusion of such terms as anode, cathode, cutoff voltage, electronic indicator, permeability, reluctance, through capacity, Type "L" generator, inverted current, and three-halves power law.

A shortcoming of the book worth noting is the omission of an index of symbols, especially since some symbols are not used uniformly, e.g.,  $u_c$  and  $e_c$ . In addition, several symbols are used with meanings different from the accepted ones, e.g., "c" for velocity (other than that of light) and  $\nabla U$  for the sum of the second derivatives of the potential with respect to the coordinates, instead of  $\nabla^2 U$ .

In appraising the book as a whole, we must say that Professor Kaganov has successfully solved the difficult problem of writing a superior Soviet textbook. Finally, we should like to express our desire that the second part of this book, "Ionic Engineering," be published in the near future.

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